CLAIMS

I claim:

1. A method for classifying vehicle occupants by measuring seat occupant weight comprising the steps of:

(a) mounting a plurality of sensors within a seat structure;

(b) generating a plurality of occupant weight signals from the sensors in response to a weight force applied to the seat structure;

(c) mapping the weight signals into a virtual matrix; and

(d) determining seat occupant weight based on the virtual matrix.

2. The method according to claim 1 including (f) classifying each seat occupant into one of a plurality of predetermined occupant weight classes.

3. The method according to claim 2 including (g) providing seat occupant weight classification to a restraint control.

4. The method according to claim 1 wherein step (a) further includes mounting the sensors in a non-symmetrical pattern.

5. The method according to claim 1 wherein step (a) further includes mounting the sensors in a symmetrical pattern.

6. The method according to claim 1 wherein step (c) further includes generating a virtual matrix to define an optimal pattern having an optimal number of seat sensor positions.

7. The method according to claim 6 wherein step (a) includes mounting the sensors into a first predetermined pattern to define a first seat sensor configuration wherein the first seat sensor configuration includes one sensor for each seat sensor position of the optimal pattern and step (c) further includes mapping one occupant weight signal from each sensor into one corresponding seat sensor position in the optimal pattern.

8. The method according to claim 6 wherein step (a) includes mounting a first number of sensors into a first predetermined pattern to define a first seat sensor configuration wherein the optimal pattern includes more seat sensor positions than the first number of sensors; step (c) further includes mapping one occupant weight signal from each of the first number of sensors into a corresponding seat sensor position in the optimal pattern to define a remaining number of virtual sensor positions, and determining a value for each of the remaining virtual sensor positions based on surrounding sensors from the first number of sensors.

9. The method according to claim 8 wherein step (a) includes mounting a second number of sensors into a second predetermined pattern to define a second seat sensor configuration that is different from the first seat sensor configuration wherein the optimal pattern includes more seat sensor positions than the second number of sensors; step (c) further includes mapping one occupant weight signal from each of the second number of sensors into a corresponding seat sensor position in the optimal pattern to define a remaining number of virtual sensor positions, and determining a value for each of the remaining virtual sensor positions based on surrounding sensors from the second number of sensors.

10. The method according to claim 1 including providing hardware for receiving the occupant weight signals, storing the virtual matrix, and mapping the weight signals into the virtual matrix.

11. The method according to claim 10 wherein step (a) includes mounting the sensors into one of multiple different seat sensor configurations and further including using common hardware for each different seat sensor configuration.

12. The method according to claim 10 wherein step (a) includes mounting the sensors into one of multiple different seat sensor configurations and further including using identical hardware for each different seat sensor configuration.

13. The method according to claim 6 wherein step (a) includes mounting a predetermined number of sensors within the seat structure wherein the predetermined number is less than the optimal number of seat sensor positions the difference defining a remaining number of virtual positions and wherein step (c) further includes using a electrically erasable programmable read only memory to map the virtual matrix by determining values for each of the remaining number of virtual positions.

14. The method according to claim 13 including storing position tables within electrically erasable programmable read only memory to be used in conjunction with occupant weight signals from surrounding sensors to determine values for each of the remaining number of virtual positions.

15. A method for classifying vehicle occupants by measuring seat occupant weight comprising the steps of:

(a) mounting a plurality of sensors within a seat structure in a physical matrix having a first pattern with a first predetermined number of rows and a first predetermined number of columns;

(b) generating a plurality of occupant weight signals from the sensors in response to a weight force applied to the seat structure;

(c) generating a virtual matrix having a second pattern with a second predetermined number of rows and second predetermined number of columns wherein the second predetermined number of rows is greater than or equal to the first predetermined number of rows and/or the second predetermined number of columns is greater than or equal to the first predetermined number of columns;

(d) mapping the weight signals from the physical matrix into the virtual matrix by mapping one weight signal from each sensor location in the first predetermined number of rows and columns into a corresponding virtual location in the second predetermined number of rows and columns; and

(e) combining data from each of the second predetermined number of rows and columns to determine seat occupant weight.

16. The method of claim 15 wherein the difference between the second predetermined number of rows and columns and the first predetermined number of rows and columns defines virtual sensor locations and step (d) further includes determining a value for each virtual sensor location by using data from the surrounding sensors in the first predetermined number of rows and columns.

17. The method of claim 16 wherein step (a) includes having a plurality of different first patterns to define a plurality of sensor configurations and including the step of using common hardware and software for every sensor configuration.

18. The method of claim 17 including using electrically erasable programmable read only memory for the mapping.

19. A system for determining seat occupant weight comprising:

a plurality of sensors mounted within a seat structure for generating a plurality of occupant weight signals in response to a weight force applied to said seat structure; and

a control unit electrically connected to said sensors for receiving said signals and mapping said signals into a virtual matrix to generate an output signal representing seat occupant weight.

20. A system according to claim 19 wherein said control unit generates said virtual matrix to define an optimal pattern having an optimal number of seat sensor positions and wherein said plurality of sensors are mounted within said seat structure to establish a first sensor configuration having a first predetermined number of sensors that is less than the optimal number of sensors to define a number of remaining virtual sensor positions, said control unit mapping one occupant weight signal into a corresponding seat sensor position in said virtual matrix and assigning a value to each of said remaining virtual sensor positions by utilizing weight signals from surrounding sensors.

21. A system according to claim 19 wherein said sensors are mounted within said seat structure in one of a plurality of seat sensor configurations and wherein said control unit includes hardware that is common to each of said seat sensor configurations.

22. A system according to claim 19 wherein said control unit includes electrically erasable programmable read only memory.

23. A system according to claim 19 wherein said control unit includes a printed circuit board having a plurality of connectors for attachment to said sensors and a central processing unit for generating said virtual matrix and mapping said weight signals into said virtual matrix.

24. A system according to claim 19 including a restraint control wherein said output signal is classified into one of a plurality of predetermined occupant weight classes and transmitted to said restraint control.